

Energy Savers Plus Program

targets significant energy savings for a
Queensland nursery

IMPLEMENTED SOLUTION 

Actual energy savings

20%

Key facts

Farm / Industry

Nursery

Product

Nursery plants

Location

Karalee

Irrigation

Drip and micro irrigation

Pumps

Centrifugal

Solution

Implemented: Solar PV system, power factor correction and lighting upgrade

The Energy Savers Plus Program is funded by the Queensland Department of Energy and Water Supply



Site profile

The nursery located in Karalee in southern Queensland produces mainly gerberas and roses and occupies an area of 1.9 hectares.

Hydroponic cultivation and heating of greenhouses enables plants to flourish all year round. Operations on site also include packaging of flowers and storage in cold rooms until their delivery to customers.

Water is drawn from the Brisbane River and treated on site via a flocculation and reverse osmosis system before it is used for irrigation. The irrigation system consists of pressure compensating drippers at each plant.

Current energy demand

The site energy consumption consists of:

- Six centrifugal pumps ranging from 0.75kW to 4.6kW to transport water from the river through the treatment system and finally to irrigation drippers.
- Two coal fired tube boilers (0.6MW and 1.2MW) producing hot water to heat the greenhouses.
- Three cold rooms.
- Lighting.

Action

The audit of site energy consumption evaluated:

- Pump variable speed control
- Lighting upgrade
- Power factor correction
- Solar PV installation

Results

Following the energy audit, three initiatives were implemented with estimated total energy savings of 21% and a combined payback period of around 5 years.

A retrofit of fluorescent light fittings to LED has been completed with energy savings of around 1,800kWh and over \$500 per annum.

The electricity tariff applied to the farm includes a peak demand charge measured

in kVA (apparent power). A comparison of maximum demand in kVA and demand in kW (real power) at the same time indicated a low power factor at 0.72.

As a result, Power Factor Correction (PFC) equipment was installed, to improve the power factor to at least 0.95, resulting in demand savings of around 12kVA and cost savings of over \$3,000 per annum. PFC can also have other benefits including extending the life of equipment and freeing up capacity for expansion without the need for new switchboards and cable.

A 30.4kW solar PV system was also installed to offset site energy consumption resulting in savings of around 39,500kWh and \$11,000 per annum.

The Pump variable speed control and pressure transducer has yet to be implemented. The upgrade would allow the pump to operate at its Best Efficiency Point (BEP) as it supplies water to irrigate different sized irrigation zones and would assist in managing pressure in the system.

Quick wins

Using a thermal camera, the Audit identified significant cold room energy losses and recommended the following actions to save up to 10% in running costs:

- Replacing worn door seals
- Limiting the time of opening doors
- Adding plastic strip curtains.



Energy savings

A summary of the energy savings achieved is as follows:

Solution	Pump Variable Speed Control	Lighting Upgrade	Power Factor Correction	Solar PV System
Actual energy savings (kWh per annum)	2,150	1,797	-	39,598
Actual operating cost saving p.a.	587	\$536	\$3,247	\$10,997
Actual cost to implement	\$2,300	\$1,248	\$9,875	\$61,165
Payback period (years)	3.9	2.3	3.0	5.6
Actual Demand Saving (kVA)	-	1.3	12.4	-
Actual energy savings (% of site total)	Yet to be implemented	1%	-	20%

Forecast savings in operating costs	Existing System	Upgraded System	Reduction in Operating Costs
Annual operating cost	\$39,146	\$24,366	-
Cost to implement	-	\$72,288	-
Operating costs for first 5 years	\$195,730	\$194,118	\$1,612
Annual operating cost for years 6 to 10	\$39,146	\$24,366	\$14,780
Total energy costs for 10 years	\$391,460	\$315,948	\$75,512

Feedback

The farm is on track to achieve some significant energy savings from the project.

